New Inventions.

Improvement in Screw Fastenings.

The accompanying engravings represent new and useful improvements in expanding screw fastenings, for which a patent was granted to John Loudon and Otto Ahlstrom, of this city, on the 3rd of July last.

The invention relates to expanding screw fastenings, to be used under conditions in which bolts and nuts of the common construction are not applicable. It consists in a method of constructing either a bolt head or a nut, as the case may require, whereby the screwing up of the nut or the bolt causes it to expand, and makes it fit tightly within any opening or hole in which it is inserted, and so wedges it in that it cannot be directly drawn out. The figures represent various modifications, applications, and views of the expanding fastening.

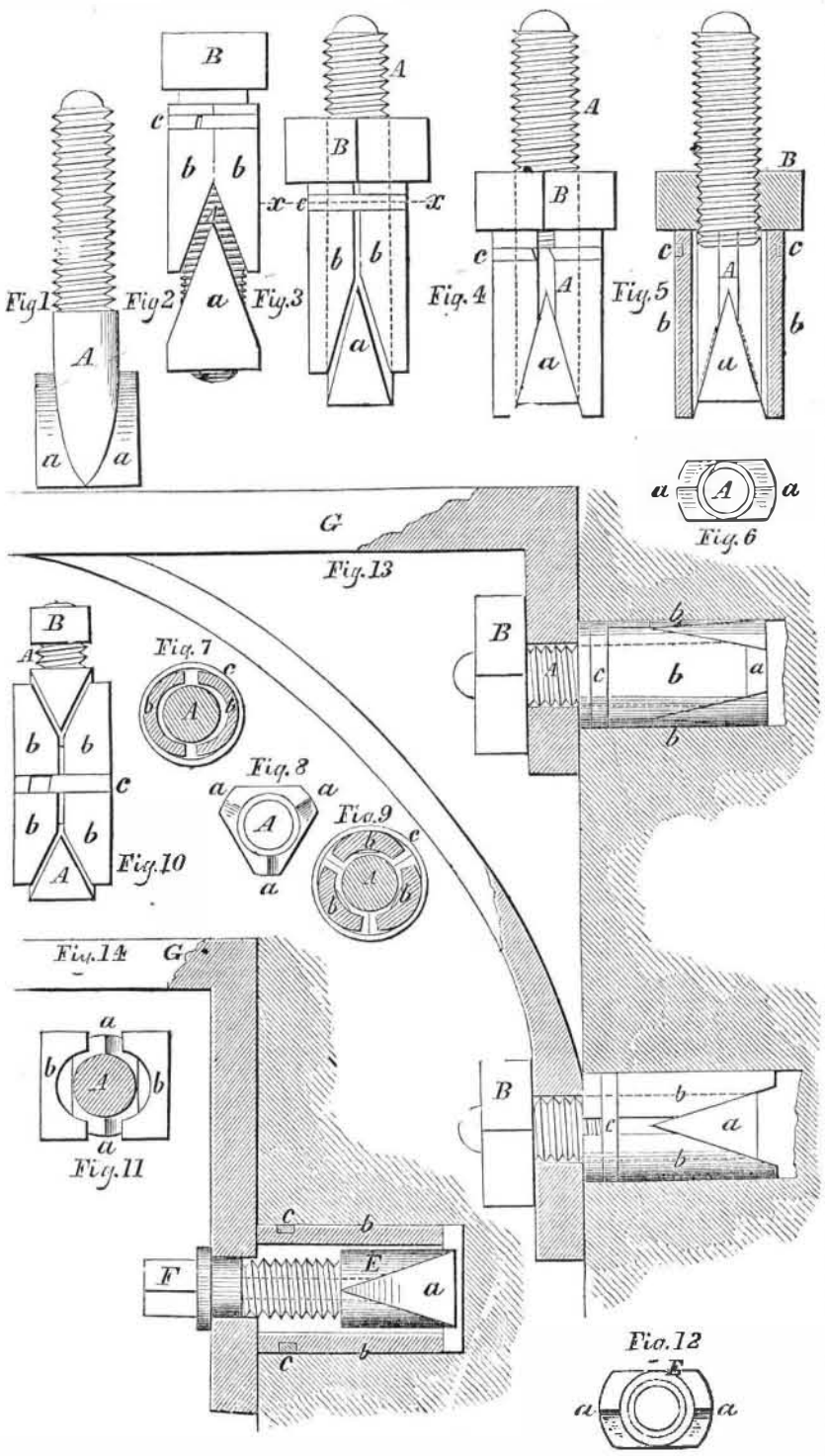
Fig. 1 is a view of a screw bolt, A, with wedges, *a a*, on its head, but its nut and expanding jaws are removed. The form of the wedges, *a a*, are shown in figs. 1, 2, 3, and 6, the latter being an end view of fig. 1. A, fig. 2, is a common screw bolt, the nut, B, being its head. The wedge, *a*, is a hollow piece with a thread inside forming a nut, and the end of the bolt works in it, so that by turning round the head of the bolt, the wedge, *a*, will be forced up into the wedge recess in the jaws, *b b*, as the screw of the bolt is forced down. The expanding jaws, *b b*, form a centrally divided small cylinder, and when drawn close together, they fit so as to work freely on the bolt. They are cut away beveling on opposite sides, as shown in fig. 4, to fit the wedges, *a a*. The wedges extend up the sides of the bolt far enough to terminate in a point, and thus allow the head to be made small and give a great breadth of bearing to the expanding pieces. A small groove is formed around the expanding pieces, *b b*, to receive a thin steel split ring, *c*, for confining them together, and yet allow them to expand, as shown in fig. 4—an outside view—and fig. 5, a section. When the nut is unscrewed and the collar or jaw loosened, this ring contracts the collar, and allows it to be removed. This would be very difficult to accomplish without this ring. The application of this ring is shown in fig. 7, which is a section in the line, *x x*, fig. 3. B, figs. 3, 4, and 5, is a nut of the common kind. The expanding jaws, *b b*, form a collar to the screw bolt, and they must be of a proper size to fit the opening in which it (the fastening) is to be placed.

Fig. 13 illustrates the application of this screw fastening, set into a stone wall to support and screw up an iron bracket. The bracket, G, has holes drilled or cast in it, and the masonry of the wall has also two holes drilled in it to correspond with those in the bracket. These holes must only be of sufficient size to let the bolt pass snugly in. The bolts, A, with the expanding pieces, *b b*, pressed tight by the ring, *c*, are first placed in the holes with the wedge heads, *a*, first or at the bottom, and the screw parts protruding outside. The bracket is then put on and held up, and the nuts, B B, placed on the bolts, and screwed up with a wrench. The act of screwing the nut close up, draws the wedges, *a a*, into the expanding jaws or collars, *b b*, and forces them apart, thus wedging them perfectly tight in the holes. The harder the nuts, B B, are screwed down, the tighter becomes the fastenings, making a perfect fit, and supporting the bracket in the most firm and substantial manner. Instead of making the bolt with only two wedge pieces, *a a* on its head, three or more may be used, and the expanding collar pieces, *b b*, must consist of a corresponding number of pieces.—Fig. 8 represents an end view of a bolt head, with three wedge pieces, *a a a*; and fig. 9 is an end view of three separate collar pieces, *b b b*, confined by the ring, *c*. In fig. 13 the upper supporting fastening is thus formed: the lower fastening in the same has but two wedges and collar pieces. By making the nut in the form of a handle, as represented in fig. 15—an outside view and a section—this expanding bolt becomes a lifting apparatus, exceedingly convenient to be inserted into a hole drilled in a block of granite or metal, to be hooked by a chain, and elevated to any part of a building in the course of erection. This principle of application of the expanding bolt does not require a perfect round hole to fit into; the hole may be square, and the expanding head may be of a square form, as represented by the end view, fig. 11—A representing the bolt, *a a* the wedge projections, and *b b* the expanding jaws.

In employing the bolt for lifting purposes, however, it is preferred to use the fastening represented by fig. 15, as there will be no danger by the slacking of the nut during the lifting operation.

Figs. 12 and 14 show the expanding principle of this fastening applied to the nut instead of the bolt—fig. 12 being an end view of the nut, E, having wedges, *a a*, at opposite sides, like the head of the bolt, A, and having the expanding pieces, *b b*, applied to it with a ring, *c*, fig. 14, in the same manner as a bolt. The bolt is a common screw, F, with a slit in its head to be driven by a screw driver. The nut is inserted in the hole drilled in the wall, and by turning the screw bolt, F, with a driver, the nut is drawn up, and its wedges force apart the expanding pieces, *b b*, until they are perfectly wedged in the opening, and thus secure the iron bracket, G, as firmly to the wall as the bolts represented in fig. 13. Fig. 10 shows a double set of wedges, with a screw bolt passing through the upper one, to force down one wedge, and draw up the other, and thus expand the pieces, *b b*, in both directions.

PATENT EXPANDING SCREW FASTENINGS.



All the expanding fastenings represented can be withdrawn by unscrewing the bolt, like any other method of screw bolting, as the bolt, A, may be unscrewed, and thus the expanding pieces become loose, so that in their very nature they are exceedingly convenient, both in the method of securing and releasing them, according to the circumstances, and the purposes for which they are applied. Stone and cast iron cornices may be secured to a back wall with these fastenings, and the head of the bolt left flush with or below the surface, so as to leave a smooth, unbroken face. For securing iron brackets to a stone wall, or cornices to a solid back wall, or for a key to hold stones, or masses of metal to be grasped with a hook, to be elevated to any hight, this expanding screw bolt is a most beautiful, useful, and effectual improvement. It is applicable to many purposes besides those named. The civil and mechanical engineer, and the architect, will at once perceive the variety of uses to which it can be applied, and can appreciate its real utility. The claims for the improvements embraced in these fastenings will be fonnd on page 353, Vol. 10, Scientific American. They are broad and strong, and their merits have been acknowledged by all who have had the opportunity of seeing the fastenings applied. Patents have been secured in France and England, as it is one of those inventions which has for its field of application "no pent up Utica," but the whole globe.

More information may be obtained by letter addressed to the patentees, at their works No. 276 Bowery, this city, where numerous specimens can be shown, to all who wish to examine them.

Improvement of Railroads.

The *Railroad Times* (Boston,) of the 4th inst., in a brief and sensible article, directs the attention of our railroads to the economy of good railways. "The very first thing needed," it says, "to economical operation, is a good permanent way." It then quotes and endorses Clark's opinion on this point, that "the great element for improvement is the permanent way," and adds: "The extra cost for tear and wear of machinery, and the extra cost of fuel on some of our badly constructed and managed roads would go some way in paying a respectable dividend. The first thing is to put your road in a condition to be operated cheaply and safely."

How true all this is. Numerous accidents have taken place from having railroads in bad repair, thereby causing losses amounting to vast sums for damage to persons and property.

The permanent way is no doubt "the grand element of improvement," and those who take opposite views misunderstand the subject. The railroad itself, as a modern element of progress, is but an improvement of the permanent way. Were this not the case, it would be the hight of absurdity to construct railroads. But could such loads be drawn or speed obtained with steam carriages on common roads as are now on railroads? No. The speed of passenger cars on the railroads in this State is double that which prevailed ten years since, and with greater economy to the stock-holders. This has been accomplished principally by improvements in the permanent way. The first railroad built in New York was the "Mohawk and Hudson." It had two inclines operated by stationary engines, and the rail was the old "flat." It never paid expenses, and the stock was about the lowest in the market until new cuts were made, and the permanent way improved. The speed on it, fifteen years since, was but fifteen miles an hour; it is now thirty miles, and the expenses of running are much less. It was the same with the whole of the sections of what is now known as the "Central Railroad." The speed on all them is about doubled for passenger trains since 1845, when the flat rail was used on a great portion of it, and the working expenses are much less in proportion to the results obtained. In the winter of 1846, when there was such an uncommon freight traffic over this road, all the machine shops belonging to it were converted into great locomotive hospitals, owing to the bad permanent way. We do not know the amount of reduction in the cost for repairs since the permanent way was improved, but it must be very great.

We are surely not at the end of improvements in railroads yet, both with regard to speed and economy. Those who take the view that the limit of speed has been obtained, and that further improvements in the "permanent way" cannot alter the results, excepting by the removal of atmospheric resistance, and traveling in a vacuum or by adopting "Bessemer's" hoods for the locomotive and cars, place themselves in an awkward conservative position.

Great improvements have, no doubt, been made in the engines and cars as well as in the railroads themselves, and still greater improvements may be expected; but in giving utterance to the foregoing we place ourselves in the position of advocates of engineers and all concerned, for the fact is introvertible, that we shall never know all that our engineers can accomplish in the building and running of locomotives until the limit of perfection has been arrived at in the "permanent way."

The carbonate of iron is stated to be excellent to stop obstinate bleeding from leech bites.